

## Jefferson Lab Weekly Briefs

June 13, 2007

### 12 GeV Upgrade

Hall C 12 GeV R&D: The Horizontal Bend magnet for the Super High Momentum Spectrometer (SHMS) in Hall C will be a small superconducting dipole magnet located close to the target that will allow measurements at the smallest scattering angles. Its proximity to the target causes radiation-induced heating of the magnet that must be accommodated in the design of the magnet's cooling system. Following simulations of this effect, a copper test device has been fabricated by collaborators from Yerevan Physics Institute to directly measure this radiation-induced heat load. Parasitic measurements using this device with electron beam in Hall C are currently underway.

### Physics

In Hall A, Experiment E04-018 (Elastic form factors of helium-3 and helium-4) completed the helium-4 portion of the experiment. The experiment still requires a week of data off of helium-3, which is presently scheduled to begin June 30. The main problem encountered during the just-completed run period was the inability to get high beam current (100 microamps). On June 8, Hall A transitioned to Experiment E03-101 (Hard Photodisintegration of a Proton Pair), which is expected to take data until June 30.

Hall B continued taking production data for the g13b run group. The run was extended for about two weeks to allow completion of the entire g13 program by the end of June. The installation of the frozen spin target (FROST) in Hall B is now planned to take place during the summer shutdown. This will shift FROST commissioning until October, when accelerator operations will resume. During the past weeks, Hall B staff has been strongly involved in preparations for the upcoming IPR 2007 review.

Hall C continues taking production data for experiments E04-001 and E06-009, measuring structure functions in inclusive electron scattering on deuterium and nuclear targets.

### Environment, Safety, Health & Quality

National Safety Month continues, with safe driving as the focus topic this week. The National Safety Council (NSC) notes that more people than ever, 201 million, are crowding the nation's highways. Although the number of injuries and fatalities has dropped by 16 percent, motor vehicle accidents remain the number one preventable cause of death. The NSC provides the following basic driving safety facts.

- Speeding is the most common error noted in fatal accidents.
- Impaired driving, due to alcohol or medications, was a factor in more than 40 percent of vehicle fatalities.
- Distracted driving accounts for about 25 percent of vehicle crashes. The most common distractions are radio/CD tuning, cell phone use, eating, personal grooming, or trying to reach for out-of-reach objects.
- More driving safety facts and safety tips can be downloaded from the [NSC web site](#).

• **Compressed Gas Cylinder Bulletin** - The DOE Office of Health, Safety and Security (HSS) has developed a compressed gas cylinder Safety Bulletin due to concerns over the number of compressed gas cylinder incidents (29 over the past five years) at DOE facilities. These cylinders are used in a variety of JLab research and support activities. The HSS Safety Bulletin is located [here](#). The ES&H Manual [Chapter 6150, Compressed Gases](#), can be accessed for specific JLab information.

### Accelerator

Most of the week was spent in good production beam running and hall pass changes. There were some minor problems encountered during the week. The Capture section in the injector faulted several times and was looked into by EES staff. Injector IOC's IN1, IN3 and IN6 crashed several times in concert on several shifts causing beam delivery delays until all the injector parameters could be restored. These three IOC's are now being watched by the

Software group in an effort to isolate the source problem. Problems were experienced after changing the Wein during the weekend; some tuning of the injector was necessary to optimize transmission. There also have been shifts in the Capture phase that prevented high current delivery to Hall C. This problem, although not solved, is understood well enough to make a useable work around. A thunderstorm going over the site caused a variety of accelerator components to trip off, including Magnets Dog2E and XSEP2T and the injector PSS segment; production beam to all halls was restored within 45 minutes.

### **Free-Electron Laser (FEL)**

FEL staff saved two months and significant money by fabricating in-house a pressure tank for the gun, rather than accepting the only commercial bid. This now brings the gun back into a plan for assembly in August per the desired schedule. Progress was also made in plans for the drive laser implementation in the Gun Test Stand.

### **Theory Center**

In a recent paper, arXiv:0705.3055v1 [hep-ph], researchers from Hampton University and JLab analyzed Regge trajectories of baryons in terms of the  $1/N_c$  expansion of QCD, where  $N_c$  is the number of colors. Neglecting spin-orbit contributions to the large  $N_c$  baryon mass operator, the evolution of the spin-flavor singlet component of the masses was analyzed with respect to the angular momentum. Two distinct and remarkably linear Regge trajectories were found, for symmetric and for mixed symmetric spin-flavor multiplets, which may provide insights into the excited baryon program at JLab.

### **Announcements**

• **Volunteer coordinator sought for the [Adopt-A-Spot program](#).** Before the Lab can make the two-year commitment, a volunteer is needed to coordinate the effort. Anyone interested in volunteering for the coordinator position may contact Linda Even, x7308 or [lle@jlab.org](mailto:lle@jlab.org).

• **The semi-annual TLD changeout will take place over the weekend of June 29.** If you have a JLab radiation badge, be sure to place your badge in its designated badge rack slot before you leave the Lab that week. This will ensure that your badge isn't missing when the changeout takes place.

• **symmetry magazine seeks physics "life list" submissions.** Bird watchers have life lists of sightings. Now fans of particle physics can have a checklist of their own, full of not-to-be missed places, experiences, and artifacts such as Galileo's middle finger; Fermilab's newborn baby buffalo; and a hand-held prototype of the first cyclotron built by E.O. Lawrence. The particle physics life list is scheduled to appear in an upcoming issue of symmetry magazine. Send symmetry editors your suggestions at [letters@symmetrymagazine.org](mailto:letters@symmetrymagazine.org) with subject line "Life List"; contributors will be acknowledged in the magazine.

• **Two public, evening talks to be given at Users Group Workshop and Annual Meeting.** Benjamin Franklin and the Future will be the topic of Fred Dylla's public lecture on Monday, June 18. On the following day, Tuesday, June 19, Bryon Anderson will give a public lecture on the Physics of Sailing. Both presentations are free, open to the general public, and will take place in the CEBAF Center auditorium at 8 p.m.; seating starts at 7:30 p.m.

• **JLab's Safety Numbers** (June 13, 2007)  
221 Days since Last Recordable Accident (JLab Record: 251)  
221 Days since Last Lost Workday Accident (JLab record: 455)

### **JLab Calendar of Events**

June 18-20: Annual Users Workshop  
June 26-28: DOE SC OPA Independent Project Review of the 12 GeV CEBAF Upgrade Project  
July 4: Independence Day holiday  
July 23-25: DOE S&T Review